

ABSTRACT

The World Wide Web (WWW) has undergone a phenomenal evolution since it was first developed. Initially the web was developed to make it easier for scientists to exchange very large amounts of information. Gradually, with the splash of collaboration, the web system has evolved along with the ever expanding and varied user needs. Along with the transition of various services to digital services, the size of web applications continues to grow. This makes application development slow and at risk of growing applications because the application is in the form of a single package. To answer the various complexities in the current application development process, the application is broken down into various small components called microservices. Kubernetes is a rapidly growing platform for developing microservice systems.

In this study, an e-Commerce web service based on the Kubernetes platform has been implemented with a vertical autoscaling feature so that the system can automatically adjust to user requirements. To support e-Commerce web services, several integrated applications are needed, namely reaction commerce for the front-end system, PostgreSQL for the back-end system, and Google Cloud Platform to make Kubernetes accessible globally. To review system performance, different tests were carried out using one master node and one worker node. The measurement parameters that were reviewed were seen from server performance based on cpu utilization, memory utilization, and load balancing tests, as well as application performance based on response time, throughput, and error percentage. .

The test results obtained are in the form of CPU utilization performance below the average of 80%, memory utilization performance below the average of 30%, and there are few anomalies in the distribution of load balancing resources. For application performance testing, the system has various response time performance results based on different tests, but referring to the ITU-T G.1030 standard the system developed is able to meet predetermined standards with a maximum response time of 6 seconds, varying throughput values, and the error percentage continues to grow along with the number of users who access it.

keywords : Kubernetes, Containerd, GKE, GCP, autoscaling